

**WRITTEN TESTIMONY OF**  
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**BEFORE THE**  
  
**SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT**  
**OF THE**  
**HOUSE TRANSPORTATION AND INFRASTRUCTURE COMMITTEE**  
**UNITED STATES HOUSE OF REPRESENTATIVES**

**May 20, 2004**

Mr. Chairman, and Members of the Subcommittee, good morning, and thank you for inviting me to discuss the contributions made by the National Oceanic and Atmospheric Administration (NOAA) to water quality improvement and restoration in the Great Lakes, and coordination of such actions with other federal agencies and state and local governments. I am Dr. Stephen Brandt, Director of NOAA's Great Lakes Environmental Research Laboratory (GLERL), headquartered in Ann Arbor, Michigan.

The Great Lakes are one of the earth's greatest treasures and one of the Nation's most important aquatic resources from an economic, geographic, international, ecological, and societal perspective. Many complex challenges lie ahead for the Great Lakes. The Great Lakes continually face extremes in natural phenomena such as storms, erosion, high waves, high and low water levels, and climate variability, all of which influence water quality and efforts to restore habitat. Population growth in the region will continue to increase stresses on the Great Lakes, adding to the complexity of management issues. The one thing that we can predict with near certainty is that the Great Lakes ecosystem will continue to change and pose a challenge for effective use and management.

On Tuesday, May 18, 2004, President Bush issued an Executive Order establishing a Great Lakes Interagency Task Force to promote regional collaboration of national significance for the Great Lakes. The Department of Commerce is one of the federal agencies on this interagency task force, and the Department looks forward to working with our partners in the federal government, and with state and local interests in the Great Lakes region.

In the early 1970s when Lake Erie was declared dead, the solution, based on best available science, was relatively clear: nutrient loading must be reduced. Our ecological understanding and technological know-how have significantly improved since the 1970s. The Great Lakes have a large, complex and economically important user base and are heavily impacted by

human activities with resultant multiple stresses. Many parts of the lakes are highly eutrophic and have needs for ecological prediction in oxygen deficiency, harmful algal blooms, recreational and commercial fisheries production, invasive species and extreme natural events (high winds, storms, dramatic changes in water influx). It is clear that future successes will depend on a holistic, ecosystem approach.

## **NOAA's ROLE IN THE GREAT LAKES**

NOAA's mission is: "To understand and predict changes in the Earth's environment and conserve and manage coastal and marine resources to meet our Nation's economic, social and environmental needs." One of NOAA's four primary goals is to, "Protect, restore and manage the use of coastal and ocean resources through ecosystem-based management." NOAA has environmental stewardship, assessment, and prediction responsibilities in the Great Lakes. NOAA conducts physical, chemical, and biotic research and environmental monitoring and modeling, providing scientific expertise and services to manage and protect Great Lakes ecosystems. The research NOAA conducts helps improve the understanding and prediction of Great Lakes processes, including the interdependencies with the atmosphere, water and sediments. In addition, all of NOAA's offices play a vital role to support the economy of the Great Lakes through NOAA's strategic themes, i.e., ecosystem, weather and water, climate, commerce and transportation.

The Great Lakes ecosystem is one of the most clearly definable regional entity under NOAA's purview and mission responsibilities, and it has a long history of interagency partnerships and collaborations. The Great Lakes region has also led the nation for decades in innovative management strategies that have spanned thousands of miles, and provide a large-scale testing ground for new science and management.

NOAA has over 15 Congressional mandates that guide its specific ecosystem research and water quality and restoration responsibilities in the Great Lakes. NOAA is mandated to provide research, monitoring and coordination throughout the Great Lakes Basin on ecosystem issues such as water resources, invasive species, foodweb dynamics, pollutants, hydrology, hydrodynamics, ice, water quantity and quality and so forth. NOAA's programs in the Great Lakes work in partnership with one another, and with other federal and state agencies to provide comprehensive science, management, and technical assistance tools to foster comprehensive environmental stewardship of the area.

Several of NOAA's activities in the Great Lakes specifically relate to water quality improvement and restoration. For example, NOAA:

- Predicts impacts of pollution and coastal development on sensitive habitats and resources, including maintaining contaminant-monitoring sites in Green Bay, and Lakes Michigan, Huron, St. Clair, Erie and Ontario to determine contaminant trends;
- Works with states to analyze changes in coastal land cover and plan habitat restoration and conservation;

- Collects, analyzes and distributes historical and real-time observations, and predictions of water levels, coastal currents and other meteorological and oceanographic data;
- Provides scientifically sound information on ecosystem processes to improve management decisions and mitigate human impacts;
- Develops and implements techniques and products to improve severe storm forecasting, and provides the weather and flood warnings, forecasts, and meteorological and hydrologic data used by research, environmental management, transportation, and community interests in the Great Lakes;
- Provides surveying, nautical charts, and other navigation services for safe shipping and boating;
- Acts on behalf of the Secretary of Commerce as a natural resource trustee for the public to protect and restore aquatic species and their habitats, and associated services such as safe navigation and transportation, recreation, commercial fishing, shoreline stabilization, and flood control;
- Partners with universities through the National Sea Grant College Program and the Great Lakes Environmental Research Laboratory to encourage stewardship of Great Lakes coastal natural resources by providing funding to, and conducting joint projects with area universities for research, education, outreach and technology transfer;
- Partners with state Coastal Zone Management programs to work with local communities and state agencies to preserve, protect, develop, restore, and enhance coastal zone resources, providing research, education, and protection of coastal and estuarine areas; and,
- NOAA's environmental satellites and NOAA's National Data Centers support Federal, state and local efforts that contribute to the Great Lakes economy and environmental monitoring. The Great Lakes CoastWatch node provides observations in the Great Lakes and supports thousands of users with the following typical applications: fisheries management, recreational fisheries support, water quality, education/research, and transportation enhancement. Support for the developing Integrated Ocean Observing Systems Regional Alliances in the Great Lakes will come from NOAA CoastWatch. Additionally, NOAA's Satellites and Information Service, in cooperation with the U.S. Navy and U.S. Coast Guard, operates the National Ice Center (NIC). The NIC is responsible for producing Arctic and Great Lakes ice analyses and forecasts that support a variety of customers in the Great Lakes region. For example, the NIC's weekly ice analyses are used by both the U.S. and Canadian Coast Guard to assess the ice conditions across the entire Great Lakes region. NIC also supports state governments in the Great Lakes Basin with specialized support, as necessary.

Currently, NOAA is appointed to chair the International Joint Commission's Council of Great Lakes Research Managers. The International Joint Commission has overall water quality responsibilities for the Great Lakes. The Council of Great Lakes Research Managers has responsibilities to coordinate Great Lakes Research related to water quality. As one example of their efforts, the Council hosted an international, interagency workshop on April 28-30,

2004, to set up a formal framework for a Research Coordination Strategy for the Great Lakes. They will also be hosting a workshop this fall to set up an integrated, international buoy-based observing system for research in the Great Lakes.

NOAA restoration activities include wetlands banking, rehabilitation of Brownfields sites, restoration of coastal wetlands and other habitats, establishing protected areas, using dredged material to enhance fish and wildlife habitat, improving water quality, fisheries management, and prevention and control of invasive species.

NOAA's restoration role includes advising on cleanup of contaminated sites, working with states and others to fund habitat restoration projects, and conducting research and monitoring activities. The issues involved in large contaminated sediment sites are multifaceted and often controversial, resulting in assessments and cleanups that can take ten or more years to complete. NOAA, through the Coastal Resource Coordination program, works with our partner agencies to promote remedies that will protect the aquatic environment, build restoration into clean up actions, and reduce overall injury to natural resources to speed their recovery. By working cooperatively at sites with cleanup and trustee agencies, local groups, and potentially responsible parties, NOAA decreases contaminant loads, reduces risks to protect sensitive species, and improves and restores habitat function. In addition to cleanup, there is often a need to restore natural resources that have been injured by contaminant releases. This can be accomplished through NOAA's trustee authority to cooperatively address liability, to assess natural resource damages, and to restore natural resources. NOAA is currently working on cleaning up and restoring 15 hazardous waste sites in the Great Lakes region. One example is the Fox River Superfund Site in Wisconsin, where the trustee agencies completed a final Joint Restoration Plan and Environmental Assessment for the Lower Fox River and Green Bay in June 2003. One settlement for natural resource damages at the site provides for the immediate acquisition and protection of more than 1,060 acres of wetland and upland habitat, and \$8.5 million for additional habitat acquisition and protection, specific recreational enhancement projects, and other water quality improvement, fishery enhancement, and habitat improvement projects, consistent with the site restoration goals.

NOAA partners with state governments through the Coastal Zone Management program, a unique, voluntary federal-state partnership that provides a proven basis for protecting, restoring, and responsibly developing the Nation's important and diverse coastal communities and resources. The Coastal Zone Management Act balances state and national interests in the management of our unique coastal resources, for conservation and responsible development. A major premise of the Coastal Zone Management Act is that the management of uses and resources of the coastal zone is best achieved at the state and local level, within a national framework. Great Lakes state Coastal Zone Management programs support and coordinate with local governments, tribal agencies, and community organizations on developing watershed management plans and protecting and managing critical coastal areas, such as coastal wetlands.

Through the Coastal Zone Management program, NOAA supports states, including all Great Lakes states except Illinois, through financial assistance, mediation, technical services and

information, and participation in state, regional, and local forums to improve water quality, provide public access to coastal resources, manage coastal hazards, restore coastal habitat, and integrate coastal management at a local level. NOAA is also currently working with coastal states to develop a national coastal management performance measurement system. The first phase of the project, a national framework, was completed in June of 2003. A joint state-federal working group has been established to identify specific indicators that will show the results of coastal management efforts in the states.

An example of recent restoration efforts is the Great Lakes Coastal Restoration Grant program, which was funded through a \$30 million appropriation in fiscal year 2001. More than 70 local government units have partnered in this program and are working on a variety of restoration projects, including contaminated sediment cleanup, invasive species removal, dune and marsh restorations, acquisition of critical habitat, and storm water management projects.

The following are examples of projects funded through the Great Lakes Coastal Restoration Grants:

- In Geauga County, OH, the Geauga Park District was awarded \$190,000 in federal funding to restore Silver Creek, reduce bank erosion, create wetland habitat areas, and reduce sediment transport downstream.
- The Indiana Department of Natural Resources (IDNR) received \$100,000 in federal funding to restore wetland habitat in the Dunes Creek watershed in Porter County, Indiana. The project further evaluated the project's impact in reducing loadings of the bacteria *E.coli* to the beaches at Indiana Dunes State Park. The Save the Dunes Council is working with the IDNR, Indiana Geological Survey and the National Lakeshore on this project.
- A grant for approximately \$340,000 was made to the City of Duluth, Minnesota to complete the cleanup of solid waste dumped on the bank of Sargent Creek, a tributary to the St. Louis River. The remediation removed approximately 50,000 tons of waste material from the stream, stream bank, and ravine.

NOAA promotes a science-based approach to water quality improvements and restoration and NOAA's research provides critical information toward this end. NOAA conducts a variety of research and monitoring applicable to restoration and water quality and coordinates activities on significant intergovernmental issues. GLERL conducts research applicable to water quality improvement and restoration and coordinates significant intergovernmental issues. NOAA's partnership with Sea Grant Colleges, government, and the private sector offers an integrated program of research, education, and technical assistance that promotes the restoration of degraded coastal habitat.

GLERL is NOAA's largest presence in the Great Lakes. It is a multi-disciplinary coastal laboratory that has taken an ecosystem approach. Its mission is to "conduct high-quality research and provide scientific leadership on important issues in both Great Lakes and marine coastal environments leading to new knowledge, tools, approaches, awareness and service." GLERL provides a solid scientific understanding and leadership for wise use and

management of Great Lakes and coastal marine environments. GLERL's research includes water quantity, water quality, water level predictions, waves, ice, circulation, climate change, contaminants, coastal observations and forecasting, satellite imagery, sediment movements, food webs, environmental and ecological prediction, and invasive species. GLERL staff are encouraged to develop cooperative research projects with other agencies focused on specific major environmental issues in keeping with NOAA's mission and goals. GLERL has a long tradition of partnerships and currently has active programs with over 150 institutions spread across 27 states, 19 federal agencies, 50 universities and a number of state, private, local and foreign agencies. The NOAA Cooperative Institute for Limnology and Ecosystem Research based at the University of Michigan allows NOAA to work effectively with any Great Lakes Basin University.

NOAA Sea Grant university scientists develop and implement methods to restore habitat, protect the public and improve water quality. NOAA Sea Grant extension agents deliver credible science-based information to the public and empower coastal communities to undertake well-planned coastal development that preserves and promotes restoration of critical coastal habitats. For example, Wisconsin's Brown County, with funding from the U.S. Army Corps of Engineers, is rebuilding the Cat Island chain of barrier islands in Green Bay to restore these important habitats for fish and wildlife. Sea Grant habitat restoration and coastal engineering specialists have provided habitat designs, identified potential water quality impacts, and helped determine acceptable PCB levels in the dredged material used for construction of the islands. Other examples of Sea Grant activity include:

- Sea Grant outreach specialists work to be sure the risks from contaminants in the environment and in seafood are communicated to the public. In Indiana and Illinois, seafood advisories are being translated into three languages to reach an additional half-million people who have difficulty with English, some of whom rely on fish for a large portion of their diet.
- Sea Grant played a significant role in the early stages of Chicago's Calumet Restoration Initiative, a plan to rejuvenate what was once a major wetland complex by reviving the industrial sector as well as cleaning up contaminated marshes, wetlands, and industrial sites. A Sea Grant funded study identified three candidate sites in the Calumet area for concurrent brownfield redevelopment and ecological rehabilitation, one of which has now been chosen for the future site of the project's environmental center. The planning of the Ford Calumet Environmental Center has involved the input of a diverse assemblage of environmentalists, community groups, industry representatives, bird watchers and educators.
- The Ohio Sea Grant College Program is developing the Ohio Clean Marinas Program, a proactive partnership designed to encourage marinas and boaters to use simple, innovative solutions to keep Ohio's coastal and inland waterway resources clean. The Program assists these operators in protecting the resources that provide their livelihood — clean water and fresh air. The basic goal of the Program is pollution prevention by making marinas and boaters more aware of environmental laws, rules and jurisdictions, and to get

as many marinas as possible to follow best management practices and to be designated as “Clean Marinas.” The Ohio Clean Marinas Program is a partnership with the Ohio Department of Natural Resources, Division of Soil and Water Conservation (Ohio Coastal Management Program) and Division of Watercraft; Ohio Department of Health; Ohio Environmental Protection Agency; U.S. Coast Guard; U.S. Army Corps of Engineers; Lake Erie Marine Trades Association and marina and yacht club owners and managers.

Aquatic invasive species are a global threat that affects the economic security, management, and uses of our coastal ecosystems. To maximize the benefits and effectiveness of NOAA’s research investments towards understanding, preventing, responding to, and managing aquatic species invasions in U.S. coastal ecosystems, the agency established the NOAA National Center for Research on Aquatic Invasive Species in July 2003. The Center is a virtual center for the matrix-managed coordination of existing research programs throughout NOAA and is administratively housed at the Great Lakes Environmental Research Laboratory in Ann Arbor, Michigan. The Center will foster partnerships to address prevention, early detection, rapid response, and management of invasive species, major restoration and water quality issue for Great Lakes ecosystems.

The major pathways by which aquatic invasive species (AIS) reach U.S. ecosystems all involve human activities, especially commerce and trade. Costs to the U.S. economy of AIS have reached 100s of millions of dollars per year and are mounting. Solutions to problems related to AIS will undoubtedly affect both the costs and policies related to commerce and trade. Congress, in the Aquatic Nuisance Prevention and Control Act of 1990 (P.L. 101-646) and the White House (Executive Order 13112, Invasive Species, February 1999) identified aquatic species invasions as a growing national problem requiring federal action.

NOAA is one of several federal agencies given joint responsibility for developing and implementing a national invasive species response and action plan. NOAA serves as co-chair of both the national Aquatic Nuisance Species Task Force and the Invasive Species Council. Therefore, it is appropriate and essential that NOAA assures the effectiveness, and maximizes the value, of its research investment on this issue. Coordination and advocacy for research within NOAA as well as across agencies, and partnering with the academic and private sector are essential to achieving this goal.

NOAA also provides monitoring and other information useful for evaluating restoration needs and success. For example, NOAA’s Mussel Watch Program analyzes contaminant levels in mussel tissue and sediments as a means of tracking the health of Great Lakes ecosystems. NOAA is also developing land cover data for the entire coastal zone of the U.S. Great Lakes. The land cover data are being developed for 2001, along with retrospective land cover for 1996, to identify changes in the landscape. These regional data sets can help coastal managers monitor urban sprawl and changes to natural resources, inventory wetland and wildlife habitat, and develop trend analyses.

NOAA is supporting restoration planning for the Great Lakes through grants to the Great Lakes Commission and the Northeast-Midwest Institute. In partnership with the Great Lakes

Sea Grant Network, they are providing technical and scientific support to the Region's leadership in the development of a comprehensive ecosystem restoration plan. The Institute is reviewing the approaches that other regions have used to launch major ecosystem restoration initiatives in order to provide guidance for Great Lakes planning efforts. The Commission and the state Sea Grant Programs are facilitating a series of state and province focus groups culminating in a Great Lakes Restoration forum that will identify restoration priorities and associated strategic actions. State workshops have already been held in Michigan, Pennsylvania, Ohio, Indiana, and New York, and will be scheduled for the other Great Lakes states later this year. This effort will help unify the many existing strategic plans from partner agencies. NOAA is working in partnership with EPA, states, and others in this effort.

The Estuary Restoration Act (ERA) (P.L. 106-457) was passed in 2000 to provide financial and technical assistance for restoration projects, and to facilitate coordination among federal and private entities that conduct restoration activities. The Interagency Estuary Habitat Restoration Council (consisting of delegates from NOAA, EPA, Department of the Army, Fish and Wildlife Service, and Department of Agriculture) administers the directives of the ERA. The nearshore waters and wetlands of the Great Lakes are classified as estuaries under the ERA, meaning that these habitats and their associated ecosystems are eligible for Estuary Habitat Restoration Program funding. As part of its responsibilities under the ERA, NOAA has developed a national database of restoration projects, including information on project goals, restoration techniques, and monitoring results. The database, released in early 2004, is publicly accessible over the Internet. As part of our responsibilities under the Estuary Restoration Act, NOAA has also developed monitoring protocols to better assess the success of monitoring restoration projects, which should be applied to restoration efforts in the Great Lakes. These monitoring protocols include a core set of indicators of ecosystem function specific to each habitat type to allow an accurate evaluation of restoration results.

Some other NOAA activities include:

- NOAA operates the Great Lakes component of the National Water Level Observation Network, which comprises 51 water level stations located on the Great Lakes-St. Lawrence system. Water level and other environmental data supplied by the Observation Network are used by a number of federal agencies and other users for safe navigation, storm surge warning, water level regulation for hydroelectric power, forecast models, coastal resource management, and habitat restoration. This information also supports international treaty commitments with Canada.
- NOAA's Navigation Response Teams conduct hazardous obstructions surveys using diving operations, data collection and mapping to support capabilities throughout the coastal United States, including the Great Lakes.
- Old Woman Creek National Estuarine Research Reserve, located on the south-central shore of Lake Erie, was designated as the seventh National Estuarine Research Reserve in 1980. The smallest and only freshwater reserve in the National Estuarine Research Reserve System, the 571-acre reserve serves as a field laboratory where



scientists can study naturally functioning systems and where students and the general public can learn about estuarine ecology in a natural setting.

- NOAA has maintained strong collaborations with the University of Wisconsin's Cooperative Institute for Meteorological Satellite Studies (CIMSS). The partnership between NOAA and CIMSS has resulted in advances in the use of remote sensing systems for meteorological and environmental satellite-based applications.
- The 448-square mile Thunder Bay National Marine Sanctuary and Underwater Preserve, located off the coast of Alpena, Michigan in Lake Huron, was designated in 2000 and protects and provides interpretive information on approximately 160 historic shipwrecks.
- NOAA data, in the form of accurate water level and vertical elevation information, play a key role in successfully restoring and sustaining healthy wetland ecosystems. Wetland vegetation is sensitive to the frequency and duration that it is inundated, suggesting that understanding the hydrodynamics of the system is essential to the proper design and engineering of a restoration project. This information is used to determine where to appropriately plant the different vegetative species.
- NOAA coordinates with EPA Headquarters and Regional offices to develop and implement the Coastal Non-point Source Pollution Control Program within the Great Lakes region. This program, authorized under the Coastal Zone Management Act, uses best available management measures to prevent and control the addition of pollution to coastal waters from five major categories of non-point pollution: agricultural, urban (including septic systems), forestry, marinas, and hydromodification. Measures were also developed to protect and restore wetlands and riparian areas, and promote the use of vegetated treatment systems.
- NOAA maintains a Hazardous Materials Scientific Support Coordinator in the Great Lakes who coordinates scientific information necessary for response to a spill of oil or other hazardous material. This support includes identification of natural resources at risk from the pollution incident, the fate and effect of the pollutant, and the development of effective restoration actions. In addition to this 24/7 response coverage, the Scientific Support Coordinator trains and drills with industry, federal, state and local response personnel within the region, providing an integral link among these agencies. All this combines to ensure rapid and appropriate response to events that threaten the water quality of the Great Lakes.

## **SUMMARY**

In summary, NOAA agrees that water quality improvement and restoration of the Great Lakes ecosystem are complex and challenging tasks. Although many federal, state, and local programs are already working together on this task, NOAA remains committed to continued improvements in coordination to help all partners to more effectively work together to restore the Great Lakes ecosystem. The complexity of the issue and the large numbers of specific projects that are being developed to address environmental problems in the Great Lakes have complicated tracking of progress toward achieving restoration goals. More consistent performance metrics among the involved agencies, improved prediction of ecosystem change, and better coordination of monitoring would facilitate reliable evaluation of progress toward regional restoration goals.

Also, it is NOAA's belief that water-quality improvements and restoration need to be based on the best available science and that an ecosystem-based management approach is essential. Our research in the Great Lakes takes a proactive approach and is focused on predicting ecosystem response to management decisions. By predicting the effects of biological, chemical, physical and human-induced changes (extreme natural events, climate change, land and resource use, pollution, invasive species, fisheries impacts and interactive effects) on ecosystems and their components, decision makers will be better tooled to make economically and ecologically sound decisions.

Thank you again for inviting me to present this overview of NOAA's current contributions to water quality improvements and restoration in Great Lakes ecosystems. I would be happy to answer any questions you might have.